

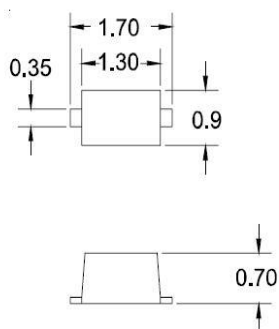
## Description

The SENXX11D5 is an uni-directional TVS diode, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive data and power line. The SENXX11D5 complies with the IEC 61000-4-2 (ESD) with  $\pm 30\text{kV}$  air and  $\pm 30\text{kV}$  contact discharge. It is assembled into a small lead-free SOD-523 package. The small size and high ESD surge protection make SENXX11D5 an ideal choice to protect cell phone, digital cameras, audio players and many other portable applications.

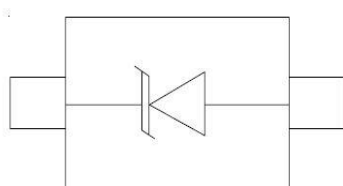
## Features

- Protects one data or power line
- Working voltage: 3.3 ~36 V
- 2-pin SOD-523 package
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test
  - Air discharge:  $\pm 30\text{kV}$
  - Contact discharge:  $\pm 30\text{kV}$
- RoHS Compliant

## Dimensions & Symbol (Unit: mm Max)



Maximum Dimensions (mm)



SOD-523 (Top View)

Package Dimensions

Circuit and Pin Schematic

## Mechanical Characteristics

- Package: SOD-523
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

## Applications

- Cellular Handsets and Accessories
- Personal Digital Assistants
- Notebooks and Handhelds
- Portable Instrumentation
- Digital Cameras
- Peripherals
- Audio Players
- Keypads, Side Keys, LCD Displays

## Marking Information



Details marking code reference specification of approval list

## Ordering Information

Part Number	Packaging	Reel Size
SEN3311D5	3000/Tape & Reel	7 inch
SEN0511D5	3000/Tape & Reel	7 inch
SEN0711D5	3000/Tape & Reel	7 inch
SEN1211D5	3000/Tape & Reel	7 inch
SEN2411D5	3000/Tape & Reel	7 inch
SEN3611D5	3000/Tape & Reel	7 inch

Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ , RH=45%-75%, unless otherwise noted)

SEN3311D5			
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	300	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	Ipp	27	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$
SEN0511D5			
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	300	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	Ipp	22	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$
SEN0711D5			
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu\text{s}$ )	Ppk	300	W
Peak Pulse Current (8/20 $\mu\text{s}$ )	Ipp	18	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm 30$	kV
ESD per IEC 61000-4-2 (Contact)		$\pm 30$	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}\text{C}$

### SEN1211D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu$ s)	Ppk	300	W
Peak Pulse Current (8/20 $\mu$ s)	Ipp	13	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm$ 30	kV
ESD per IEC 61000-4-2 (Contact)		$\pm$ 30	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}$ C
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}$ C

### SEN2411D5

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu$ s)	Ppk	300	W
Peak Pulse Current (8/20 $\mu$ s)	Ipp	5	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm$ 30	kV
ESD per IEC 61000-4-2 (Contact)		$\pm$ 30	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}$ C
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}$ C

### SEN3611D5

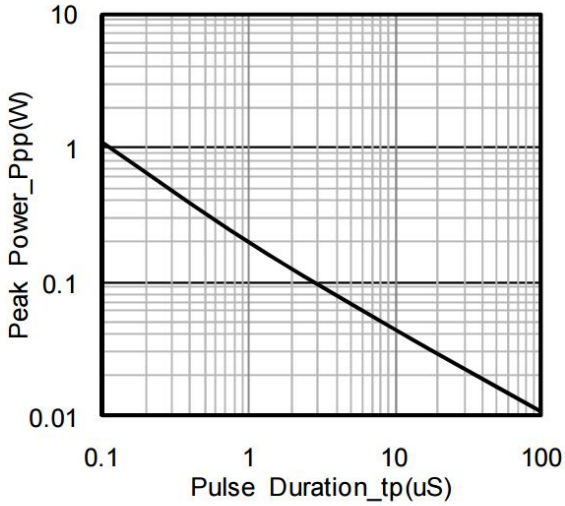
Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20 $\mu$ s)	Ppk	300	W
Peak Pulse Current (8/20 $\mu$ s)	Ipp	4	A
ESD per IEC 61000-4-2 (Air)	VESD	$\pm$ 30	kV
ESD per IEC 61000-4-2 (Contact)		$\pm$ 30	
Operating Temperature Range	TJ	-55 to +125	$^{\circ}$ C
Storage Temperature Range	Tstg	-55 to +150	$^{\circ}$ C

Electrical Characteristics ( $T_A=25^\circ\text{C}$ )

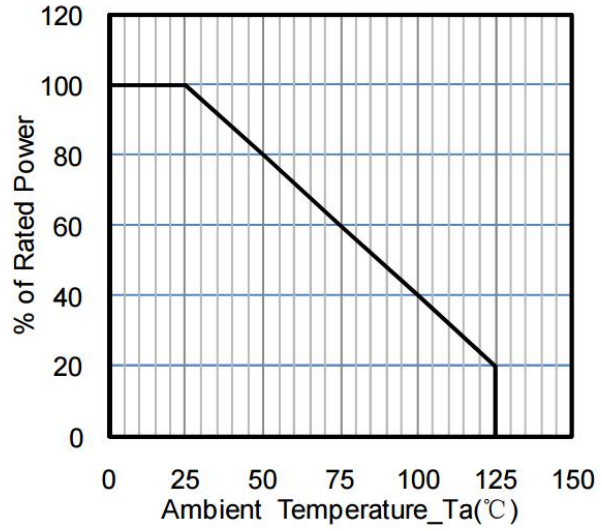
SEN3311D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			3.3	V	
Breakdown Voltage	$V_{BR}$	4.8			V	$I_T = 1\text{mA}$
Reverse Leakage Current	$I_R$			45	$\mu\text{A}$	$V_{RWM} = 3.3\text{V}$
Clamping Voltage	$V_C$		7		V	$I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse)
Clamping Voltage	$V_C$			15	V	$I_{PP} = 27\text{A}$ (8 x 20 $\mu\text{s}$ pulse)
Junction Capacitance	$C_J$		150		pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$
SEN0511D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			5	V	
Breakdown Voltage	$V_{BR}$	6			V	$I_T = 1\text{mA}$
Reverse Leakage Current	$I_R$			10	$\mu\text{A}$	$V_{RWM} = 5\text{V}$
Clamping Voltage	$V_C$		9.8		V	$I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse)
Clamping Voltage	$V_C$			19	V	$I_{PP} = 22\text{A}$ (8 x 20 $\mu\text{s}$ pulse)
Junction Capacitance	$C_J$		160		pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$
SEN0711D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			7	V	
Breakdown Voltage	$V_{BR}$	7.5			V	$I_T = 1\text{mA}$
Reverse Leakage Current	$I_R$			1	$\mu\text{A}$	$V_{RWM} = 7\text{V}$
Clamping Voltage	$V_C$		12		V	$I_{PP} = 1\text{A}$ (8 x 20 $\mu\text{s}$ pulse)
Clamping Voltage	$V_C$			20	V	$I_{PP} = 18\text{A}$ (8 x 20 $\mu\text{s}$ pulse)
Junction Capacitance	$C_J$		160		pF	$V_R = 0\text{V}$ , $f = 1\text{MHz}$

SEN1211D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			12	V	
Breakdown Voltage	$V_{BR}$	13.3			V	IT = 1mA
Reverse Leakage Current	$I_R$			0.2	uA	VRWM = 12V
Clamping Voltage	$V_C$		16		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	$V_C$			30	V	IPP = 13A (8 x 20uS pulse)
Junction Capacitance	$C_J$		65		pF	VR = 0V, f = 1MHz
SEN2411D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			24	V	
Breakdown Voltage	$V_{BR}$	27			V	IT = 1mA
Reverse Leakage Current	$I_R$			10	uA	VRWM = 24V
Clamping Voltage	$V_C$		40		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	$V_C$			60	V	IPP = 5A (8 x 20uS pulse)
Junction Capacitance	$C_J$		40		pF	VR = 0V, f = 1MHz
SEN3611D5						
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Working Voltage	$V_{RWM}$			36	V	
Breakdown Voltage	$V_{BR}$	38			V	IT = 1mA
Reverse Leakage Current	$I_R$			0.2	uA	VRWM = 36V
Clamping Voltage	$V_C$		50		V	IPP = 1A (8 x 20uS pulse)
Clamping Voltage	$V_C$			75	V	IPP = 4A (8 x 20uS pulse)
Junction Capacitance	$C_J$		30		pF	VR = 0V, f = 1MHz

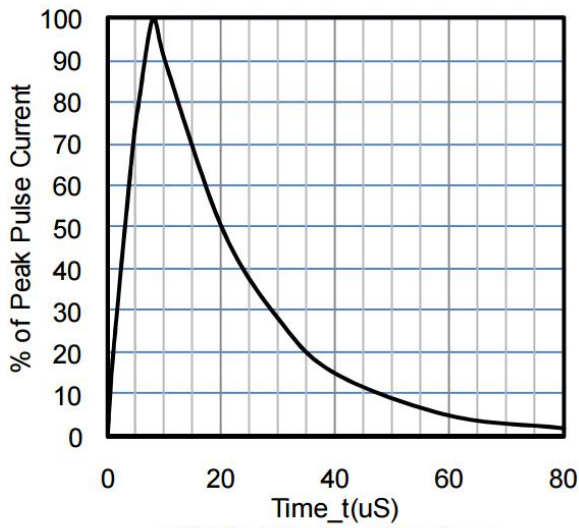
Typical Performance Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise Specified)



Peak Pulse Power vs. Pulse Time



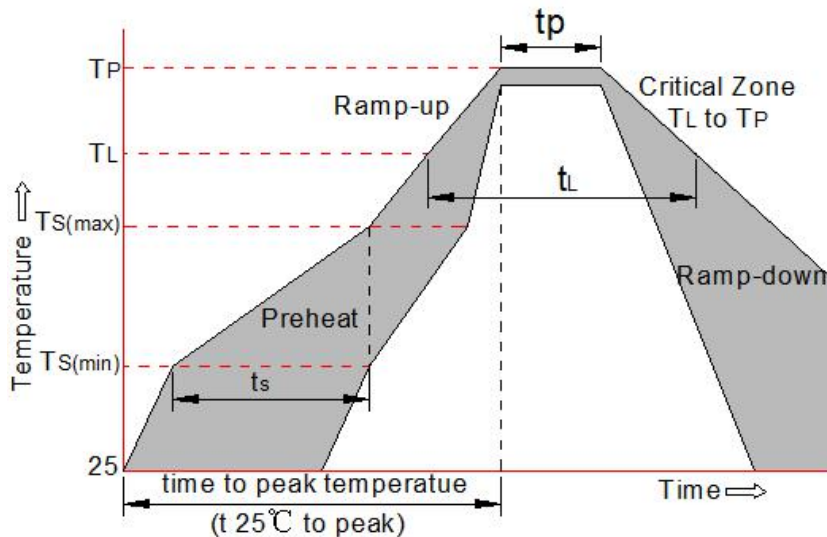
Power Derating Curve



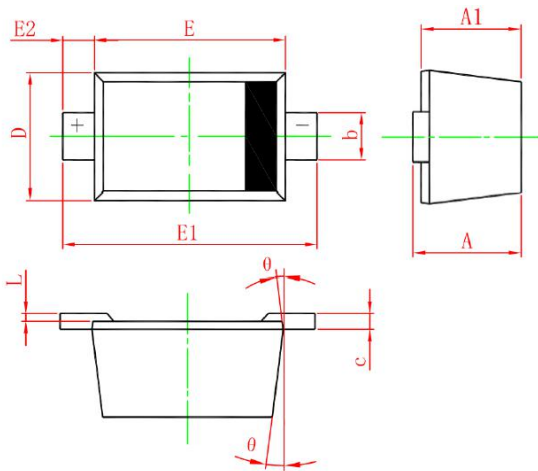
8 X 20uS Pulse Waveform

Soldering Parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_s$ )	60-180 secs.
Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ ) (Liquid us)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max
Do not exceed		+260°C

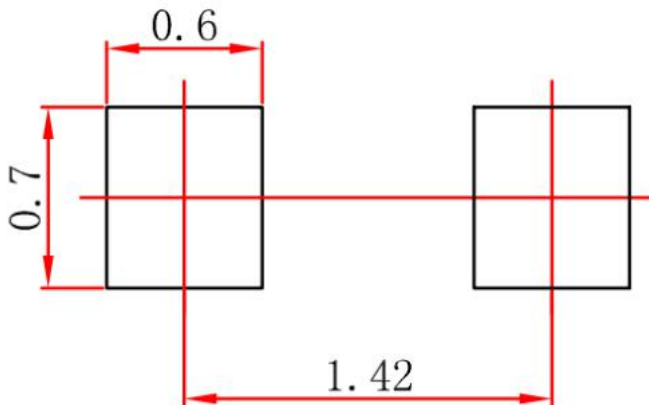


Package Mechanical Data



SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.51	-	0.77	0.020	-	0.031
A1	0.50	-	0.70	0.020	-	0.028
b	0.25	-	0.35	0.010	-	0.014
c	0.08	-	0.15	0.003	-	0.006
D	0.75	-	0.85	0.030	-	0.033
E	1.10	-	1.30	0.043	-	0.051
E1	1.50	-	1.70	0.059	-	0.067
E2	0.20REF			0.008REF		
L	0.01	-	0.07	0.001	-	0.003
Φ	7° REF			7° REF		

Suggested Land Pattern



Contact Information

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